

No. 9.—*New Plagiostomia and Chismopnea.* By SAMUEL GARMAN.

PLAGIOSTOMIA.

In the Myliobatidae there are four well-marked genera. Three of these have been established in some manner ever since the time of Cuvier. The fourth, *Aetomylaeus*, species of which have been recognized quite as long, has been lost in one of the others, hidden by resemblances. Outwardly its species are so like those of *Myliobatis* that they have readily passed as congeneric. It was only upon the disclosure of internal differences of the structure that the value of certain external peculiarities was given proper consideration. The absence of a serrated spine behind the dorsal fin, if not the result of accident, for one item, has been looked upon as questionably sufficient for specific distinction. On dissection of some of the species, however, this feature is found to be associated with a division of each pectoral at the side of the head, that is, with absence of pectoral rays connecting the cephalic portions with the main sections of the pectoral fins, a characteristic of *Aëtobatus* and not of *Myliobatis* in which the species have been located heretofore. We may note slight differences in the appearance of the pectorals opposite the angles of the mouth after discovery of the lack of pectoral rays in these positions, but the import of these features has been overshadowed by the fact that in the species under notice they are associated with a dentition practically the same as that of *Myliobatis*. Further comparisons assure us that in these species we are dealing with a genus distinct from *Myliobatis* and considerably more specialized, as is evident from the division of the pectorals and the loss of the serrated dorsal spine. In brief summation, the new genus agrees with *Myliobatis* in dentition and in nasal valves, while it differs in the divided pectorals and in the lack of a dorsal spine; and it agrees with *Aëtobatus* in the pectoral divisions, while differing in regard to dentition, nasal valves, and absence of the spine. These peculiarities, with others of less value perhaps, suffice to fix the place of the new genus, *Aetomylaeus*, as intermediate between *Myliobatis* and *Aëtobatus*. How the divergences and the accompanying af-

finities affect the classification may be more clearly seen in the following synopsis :

- Pectoral fins continuous at the sides of the head ;
a serrated spine behind the dorsal fin ;
nasal valves confluent, broadly free behind the isthmus ;
teeth of each jaw in a broad median and in narrow lateral series *Myliobatis*.
- Pectorals not continuous, the two cephalic parts forming one lobe ;
no serrated spine behind the dorsal fin ;
nasal valves in a quadrangular flap, free behind the isthmus ;
teeth of each jaw in a broad median and in narrow lateral series *Aetomylaeus*.
- A serrated spine behind the dorsal ;
nasal valves in two pointed lobes, not free behind the isthmus ;
teeth of each jaw in a broad single row *Aëtobatus*.
- Pectorals not continuous, cephalic portions in two lobes ;
a serrated spine behind the dorsal fin ;
nasal valves confluent, broadly free behind the isthmus ;
teeth of each jaw in seven or more rows, median more often
broader *Rhinoptera*.

Aetomylaeus*, gen. nov.

The body and fins of this genus are like those of *Myliobatis* and of *Aëtobatus*. It is distinguished from both by absence of a serrated dorsal spine on the tail, from the first by absence of pectoral rays connecting the cephalic with the main lateral portions of the fin, and from the second by the dental laminæ, each of which consists of a broad median series at each side of which there are three narrow rows, as in *Myliobatis*. The mesopterygia are fused with the shoulder girdle, as in *Aëtobatus*.

This genus partakes of the characters of both the genera mentioned; but by the grouping of those possessed in common, and by the possession of others peculiar to itself, it appears to be entitled to recognition as distinct from either. The type species is that figured by Gray, 1834, in the Illustrations of Indian Zoölogy, 2, Plate 101, under the name *Myliobatis maculatus*, and described by Müller and Henle in 1841. The species described by Müller and Henle as *Myliobatis milvus* has the same structure, and in all probability *Raia nichofii* of Bloch and Schneider, and *Myliobatis vespertilio* of Bleeker agree with *maculatus* in their anatomy and should be included. Provisionally the genus may be constituted as below.

- No caudal spine ; tail long, slender, whip like ;
origin of dorsal fin behind the ends of the bases of the ventrals ;
back armed with small tubercular spines in the middle ;
disk less than twice as wide as long ;
brown-edged ocelli on the hinder part of the disk *maculatus*.

- Origin of dorsal fin opposite the ends of the bases of the ventrals;
back smooth;
disk less than twice as wide as long;
green brown-edged ocelli on hinder part of disk *milvus*.
Disk twice as broad as long;
blue cross-bands, about five, disappearing with age, no spots . . *nichofii*.
Origin of dorsal fin backward from ends of bases of ventral fins.
back smooth;
disk less than twice as broad as long;
brownish with networks of black lines, anteriorly in bands . . *vespertilio*.

Rhinobatus rasus, sp. nov.

The snout of this species is pointed and elongate, more than three and a half times the width of the crown between the orbits. The rostral ridges are close together, parallel in most of their length, and show little or nothing of a groove between them. The crown is broad and has little convexity. The eyes are small and prominent. Each spiracle is as large as the eye and has two folds on the hind margin, the inner one of which is the smaller. In width the nostrils are about one-fourth of the snout. The anterior nasal valve is narrow and does not extend upon the internarial space. Mouth, in width more than one-third of the length of the snout, nearly straight. Entire upper surface covered with fine scales, which are larger near the vertebral column and on the top of the head. A row of larger tubercular scales on each rostral ridge; two stronger tubercles in front of each eye, one or more at the inner edge of each spiracle, a row of nineteen large tubercles from the back of the head to the first dorsal fin, and a pair, the outer one of which is smaller, on each shoulder. Lower surfaces entirely covered by fine shagreen. Of the fins the hinder angle on each dorsal is pointed and the hinder margins are concave; the caudal is narrow.

Brownish, whitish at each side of the rostrum, with a darker area opposite the shoulder girdle on the base of each pectoral fin, and with a clouded spot of darker below the end of the snout on an otherwise uniform whitish lower surface.

Type Cat. 235 M. C. Z., from Akra, Gulf of Guinea.

This species is distinguished from the species *R. percellens* and *R. rhinobatos* by the pointed snout, the narrow nasal valve, the enlarged scales on the middle of the upper surfaces, and especially by the rostral ridges.

Rhinobatus acutus, sp. nov.

Rhinobatus acutus is readily distinguished from *R. rhinobatos* by its very long and more pointed snout, by its narrow nostrils, and by its wide internarial space, which last is one and one-third times the width of the nostrils; these features also separate this form from any other of the Indo-Asiatic species. Snout long, length little less than one-fourth of the total length, ending in a sharp point. Mouth nearly midway between the pelvis and the end of the snout, slightly arched, in width little less than one-third of the length of the snout. Rostral ridges slender, not widened at the end, confluent at about one-fifth of their length from their

bases, beyond which point to the extremity the ridges are hardly distinguishable. In either a transverse or a longitudinal section between the eyes the crown is convex. Spiracle as large as the eye, with two rudimentary folds on the hind margin of equal size and remote from one another. Nostrils comparatively small, in width about two-thirds of the internarial space and elliptical in shape, rather than short and broad and larger at one end than at the other, as is the case with *R. rhinobatos*, *R. thouini*, and allies; distance of the outer angle of one from that of the other less than half the length of the snout. Anterior nasal valve small, lateral extension from the free portion less than the length of the latter, not extended from the margin of the nostril. The anterior nasal valve is not continued to the inner angle of the nostril; it is not extended upon the internarial space; in fact it is carried very little of the distance from the free flap, or cirrus, toward the angle. Scales very small, keeled or sharp-pointed on the upper surfaces, those on the under surfaces more flattened. Compressed sharp tubercles appear in a row on each rostral ridge, increasing in size backward; three tubercles in front of each orbit, and a couple at the inner edge of each spiracle. About twenty larger tubercles occur between the back of the head and the first dorsal fin in a vertebral row; there is a pair of tubercles at each side of this row on the shoulder girdle, the inner one of each pair being the larger. A single tubercle stands at the origin of the second dorsal fin. Of the dorsal fins the second is somewhat larger than the first; both are convex on the front margin and concave on the hinder. The fin area of the caudal fin is small.

Color an olivaceous-brown or brownish olive on the back, darker toward the spinal column, dingy white at each side of the rostral cartilage and between the ridges at its base, whitish on the lower surfaces.

Type Cat. 807 M. C. Z., from Ceylon.

Raia kincaidii, sp. nov.

On the fins of *Raia kincaidii* the angles are so broadly rounded that the disk is best described as subround. The snout is of medium length; it is outlined in broad curves, and the tip has the appearance of an oblong or quadrangular slightly produced inset; the rostral cartilage is broad at the skull and tapers rapidly about half the way to the tip, where it ends in a sharp point. The eyes are of medium size; they are prominent, and the interorbital space is slightly convex. Mouth moderate, curved forward in the middle, as wide as the distance between the shoulder spines, which is a little less than half that of the mouth cleft from the tip of the snout. Teeth rather large, in thirty-three rows on the upper jaw and thirty-one on the lower, with flattened crowns from which there is a raised sharp cusp at the posterior margin. Gill clefts small, the greatest width not more than half the length of the eye. Tail as long as the disk, depressed and strong anteriorly, tapering gradually to slender, with a dermal fold on each side and with a finlet behind the second dorsal. Dorsal fins equal, separated by a space of the ocular width bearing one or more tubercles. Upper surface covered by small, sharp, closely set hooked scales: a row of twenty-nine larger tubercles —

compressed, hooked, striate-based, buttressed in front — above the vertebrae from the back of the head to the second dorsal fin; no larger tubercles around the eyes or the spiracles. Ventral fins broad, anterior portion of moderate length, notch of medium depth, containing four digits.

Color of the back uniform slaty or leaden-brown, with small spots of black. A white spot on each side of the tail at one-fourth of the distance from the base to the end of the second dorsal fin, and a faint spot of light color near the middle of the hinder half of each pectoral fin. Lower surface of disk white, smooth; lower side of tail darker along the middle.

Type Cat. 1261 M. C. Z., from Friday Harbor, Washington.

The name is given in honor of Dr. Trevor Kincaid, to whom we are indebted for knowledge of the species.

CHISMOPNEA.

Chimaera barbouri, sp. nov.

As compared with other species of the genus the body of this one is moderately stout and the tail is somewhat less elongate. A feature that at once serves to distinguish this species is the shape and height of the second dorsal fin; as on *Chimaera mirabilis* of Collett, this fin is high anteriorly and posteriorly, and the outline is convex, while in the middle of its length there is a deep concavity where the height of the fin is less than half as much, the lowest portion being reached by a gradual descent from either end. The eye is large; it occupies nearly one-third of the length of the head. The snout is massive; its length is greater than that of the eye. The dental plates are thin and sharp on their outer edges. In each vomerine plate there are five enamel rods, as in *C. monstrosa*, but in *C. barbouri*, the inner one of the five, the longest and the strongest, stands at a little distance from the others. Each palatine plate has a pair of prominent longitudinal tritors on its side near the inner edge, and on each mandibular plate there is a single prominence not so elongate as those to which it is opposed on the roof of the mouth. These lateral tritors, being the results of wear on the sides of the enamel rods, only appear in older individuals, and of course are not present in the younger ones, which are provided with the marginal tritors on the edges of the plates, on the ends of the enamel rods, as was pointed out for other species of Chimaera in the article on the Chismopnea, 1904, Bull. M. C. Z., 41, p. 258. In a measure the palatine and mandibular plates of the specimen before us resemble those of some Callorhynchi, as may be seen by comparing with figures 1-4 of Plate 6 of the mentioned article.

In the first dorsal fin the spine is triangular; it bears hooked spinules on the hinder angles. The dorsals appear to be widely separated, but they are united by a very low fold of membrane. The height of the first dorsal, from origin to apex, is much less than the entire length from the second dorsal to the origin of the first. The greatest length of the rays of the second dorsal approximates the length of the eye, which is about twice the length of the rays in the depth of the concavity of the fin. In height the supracaudal fin is somewhat less than

the second dorsal, and perhaps the rays are a trifle longer than those of the sub-caudal, which fin extends much farther forward and backward than the supracaudal. A deep notch not quite reaching the inner edge of the fin separates the second dorsal from the supracaudal, and immediately behind this notch there is a portion of the supracaudal, in the individual under description, which rises in a sharp point followed again by a sharp notch not half the depth of the fin. It may be this point is a mere variation in this specimen. The caudal filament is of medium length; it is apparently complete. There is no separate anal fin. As in *C. affinis*, the pectoral does not reach the ventral; it is broader and less narrowed toward the end than in *C. monstrosa*.

Lateral Line System. — One respect in which this species differs from other Chimaerae is seen in the aural section of the lateral line system. On others the aural makes an angle backward in the middle and from this angle sends back a short line toward the dorsal spine; on the present specimen the line makes a curve across the aural region and has neither the angle nor the line extending backward. It is like that of the *Callorhynchus* figured in the article on the lateral system, Garman, 1888, Bull. M. C. Z., 17, Plates 3 and 4, and is unlike the aural of *Chimaera monstrosa*, as figured on Plate 2 of the same article, or of the other species of the genus. The lateral line on the flank starts from the junction of the occipital and the orbital in a short descending curve, behind which it rises to curve in the opposite direction, making a sigmoid from which it takes a nearly straight course backward to descend to the lower edge of the muscular bands of the tail below the anterior portion of the supracaudal fin. The jugular and the oral portions of the line are separated by a short space at their junction with the orbital. The oral makes a decided curve backward below the orbital above the angular, and another below it; in other Chimaeras the oral is more nearly straight. The outward curve in each cranial is farther forward than on *C. phantasma*, that is, farther from the aural junction, and the oral curves are more pronounced. The great curve, in front of the eye, in the suborbital, is more open than that of *C. phantasma*, more nearly resembling that of *C. mitsukurii*; it does not make so great a turn backward before passing forward to meet the rostral.

The back is dark brown or blackish, shading to light on the lower portions of the flanks, and is marked by white spots: a small spot of white in front of each eye, another behind each orbit, one on each shoulder below the base of the dorsal spine above the lateral line, a larger one below the hinder extremity of the first dorsal, one below the anterior portion of the second dorsal, and another below the lateral line above the base of each ventral fin. Anteriorly the white spots are about the size of the pupil; posteriorly they are larger. Slight cloudings in the brown on the lower parts of the sides may or may not be due to accidents in preservation.

Type Cat. 1281 M. C. Z., from Aomori, near Tsugaru Strait, Japan.

Named in honor of Mr. Thomas Barbour, through whose enthusiastic interest the opportunity of description was provided.